REMARKS

The claims are 1, 2 and 4-9, with claim 1 being the sole independent claim. Claims 1 and 5 have been amended to better define the present invention and new claims 8 and 9 have been added. Support for this amendment and the new claims may be found throughout the specification, for example, at page 3, lines 9-21, page 4, lines 3-16, and in claim 5, as originally filed. No new matter has been added. Reconsideration of the present claims is expressly requested.

As stated previously by Applicants, claims 1-4, 6 and 7 stand rejected under 35 U.S.C. § 102(b) as being allegedly anticipated by WO 98/11619 (Green). Claim 5 stands rejected under 35 U.S.C. § 103(a) as being allegedly obvious from Green in view of GB 2,212,504 (GB '504). Claims 1, 2 and 4-7 stand rejected under 35 U.S.C. § 103(a) as being allegedly obvious from U.S. Patent No. 5,470,667 (Williams) in view of Green. Claims 1, 2 and 4-6 stand rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Makoto Ue et al., "A New Gelling Agent and Its Application as a Solid Electrolyte for Lithium Batteries," 38(9) Electrochemica Acta 1301-1302 (1993) (Ue) in view of Green. These rejections are respectfully traversed.

Applicants have previously discussed in detail the differences between the presently claimed invention and the cited art. However, in view of the amendments to claims 1 and 5, Applicants would again like to review these differences, which are now even more clear in view of the above amendments.

Green is directed to an electrolyte suitable for batteries, supercapacitors, electrochromic windows and displays. This reference discloses an electrolyte comprising a

composite of a polymer and a molten salt electrolyte immobilized within a polymer such as polyethylene oxide. The polymeric gelling agent in Green is clearly not a non-polymeric associated body formed by inter molecular bonding, e.g., coordination bonding or hydrogen bonding.

The gelling agent of the present invention (gelator) is a non-polymeric, low molecular weight, self-assembling compound that forms an associated body by an intermolecular force such as hydrogen bonding. These gelators are relatively new in the art. Therefore, for the Examiner's convenience, Applicants have enclosed herewith a chapter from a book by Franck Sebastiaan Schoonbeek, which provides a clear and detailed description of low molecular weight gelators.

Schoonbeek defines low molecular weight gelators on page 12 as "small organic molecules that interact (in solution) with each other in such a way that large, supramolecular aggregates are formed, which in turn induce gelation of the solvent." As noted in the subject specification at page 3, lines 9-21, the presently claimed gelling agents are self-assembling compounds that intertwine with each other to form a network structure. This is clearly different from polymeric gelling agents, which are basically long chains of polymerized monomers (not a network structure), as described in the subject specification at page 2, lines 7-11. In addition, as mentioned previously by Applicants, the electrolyte obtained in Green is not a gel, but is a flexible film.

GB '504 cannot provide the teachings lacking in Green. The Examiner cited this reference for a teaching of a solid polyacrylamide electrolyte that includes an

amine-susbtituted cyclohexane ring as a plasticizer. Even if, assumed, arguendo, that GB '504 contains the alleged teaching, this reference fails to disclose or suggest a non-polymeric gelling agent as presently claimed. Therefore, the presently claimed invention is clearly patentable over the combination of Green and GB '504.

Ue and Williams teach using non-polymeric gelling agents to "hold in" the liquid electrolyte, where the gelling agents and the electrolyte are dissolved in a solvent, heated and then cooled down to settle. Green, as mentioned above, discloses an electrolyte as a composite of a polymer and a molten slat, where the electrolyte is prepared by mixing a polymer dissolved in an organic solvent and a molten salt, with the mixture being cast on a glass substrate to form a film.

Applicants respectfully submit that it would not have been obvious to a person skilled in the art to prepare a gel electrolyte using a molten salt taught by Green in the electrolytic solution with a non-polymeric gelling agent, which is taught by Ue and Williams. It is clearly explained by Schoonbeek (pp. 4-5; Figure 1.2) that the role of the solvent in the gellation process is very important.

Specifically, Schoonbeek states on page 4 that "there is often a very delicate balance between structure, intermolecular interactions and gelating properties." Further, Schoonbeek teaches:

> In order to develop molecular design criteria one should consider the events and intermolecular interactions that occur during the process of gelation (Figure 1.2). First, there are the interactions between the gelator molecules themselves. They should form aggregates, and the growth of the aggregate should preferably take place in one direction (anisotropic growth, *vide infra*). After the formation of long, fibroid

structures, some kind of contact has to exist between the separate aggregates. However, this secondary interaction should not be too large, since in such cases a phase separation may occur, which may eventually result in crystallisation [sic]. It is obvious that the balance between the transitions in Figure 1.2 may be very delicate and that the role of the solvent (polarity, polarisability [sic]) is evident.

Schoonbeek, page 4 (emphasis added).

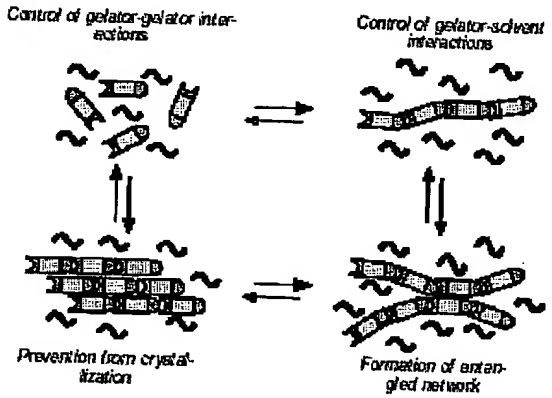

Figure 1.2 Crucial steps in the formation of gels.

What is more, Schoonbeek states on page 2 that the solvent effects are even more important in physical gel formation, i.e., hydrogen bonding, especially in connection with organic solvents. Clearly, it would not have been possible to predict based on the disclosure in the prior art that a non-polymeric gelling agent would gel in a molten salt instead of an electrolytic solution with little or no organic solvent.

Even if, assumed, arguendo, that the teachings of Williams, Ue and Green could be combined, the resulting combination would still not affect the patentability of the presently claimed invention. The Examiner has used the disclosures of Williams and Ue to supply a teaching of a non-polymeric gelling agent. However, as the Examiner will note,

the non-polymeric gelling agents in these references are not encompassed by the present claims.

Specifically, Williams and Ue disclose the use of dibenzylidine sorbitol derivatives. As discussed in the specification at page 4, lines 7-16, such derivatives are relatively unstable and tend to free an aldehyde at room temperature and in the presence of water, i.e., hydrolysis.[1] Also, these derivatives are likely to give off an offensive odor and cause staining. Therefore, if dibenzylidine sorbitol derivatives are used, a stabilizer must be added, as shown in the Reference Example in the present application.

To the contrary, the Examiner will note in Examples 1-18 and 20-26, the gel electrolytes were prepared without adding a stabilizer, and these electrolytes remained stable even after being stored at room temperature for 6 months. Clearly, Williams and Ue do not disclose or suggest the non-polymeric gelling agents as presently claimed.

In conclusion, Applicants respectfully submit that the cited references, whether considered separately or in any combination, do not teach or suggest the combination of elements presently claimed. Accordingly, all rejections should be withdrawn.

Wherefore, it is respectfully requested that the claims be allowed and that the present case be passed to issue.

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[1]/The Examiner will note that gelling agents exhibiting such characteristics have been specifically excluded from the claims.

Applicants' undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,

_____
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APPENDIX

Application No. 09/417,832
Attorney Docket No. 03500.013929

IN THE SPECIFICATION:

The paragraph beginning and ending on page 36, line 26, has been amended as follows.

Reference Example [19]

IN THE CLAIMS:

Claims 1 and 5 have been amended as follows:

1. (Three Times Amended) A gel electrolyte comprising: [containing at least]

a gelling agent forming a fibrous body; and

an ionically conductive material, which is liquid at working temperature and which is held in the fibrous body by said gelling agent,

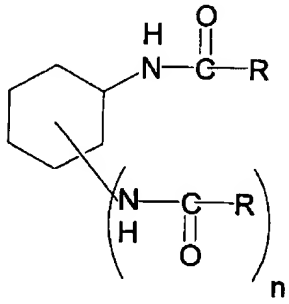
wherein said gelling agent substantially does not free an aldehyde at room temperature and in the presence of water,

wherein the fibrous body is [forming an] associated [body] via intermolecular bonding, and

wherein said gelling agent is a non-polymeric gelling agent.

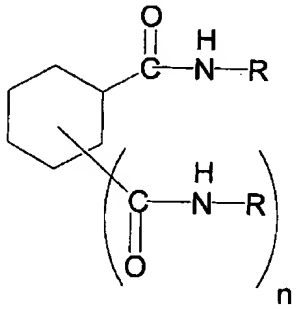
5. (Twice Amended) The gel electrolyte of claim 1, wherein said gelling agent is selected from the group consisting of the compounds represented by the

following formulae (1) to (17) and (19) to (26):



(1)

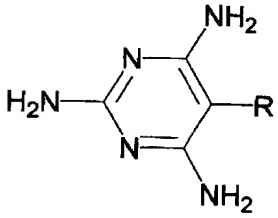
(n = 0, 1, 2)



(2)

(n = 0, 1, 2)

(3)



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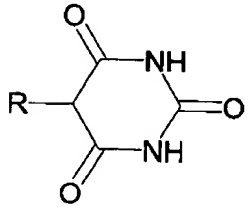

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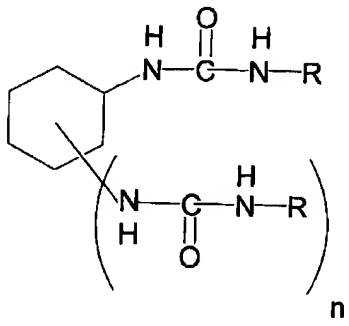
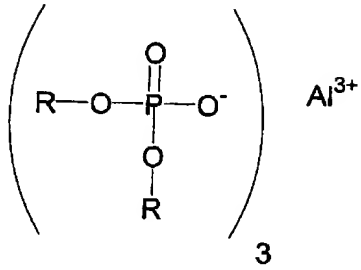


(n = 0, 1, 2) (6)



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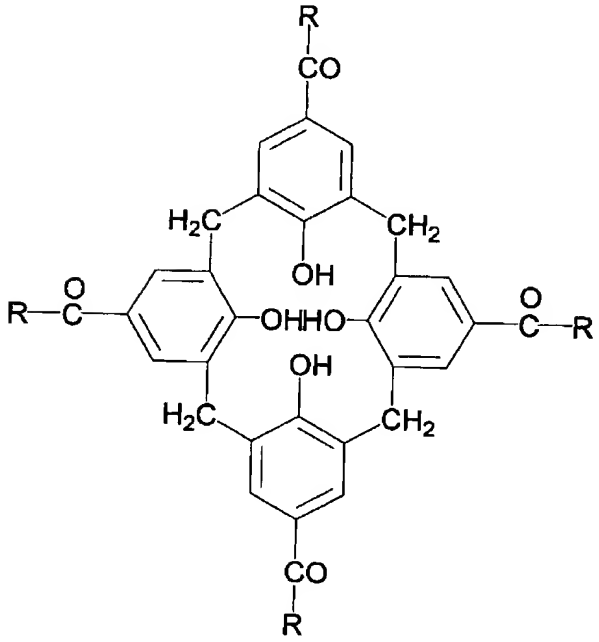

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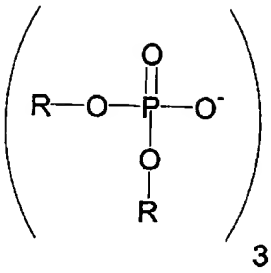

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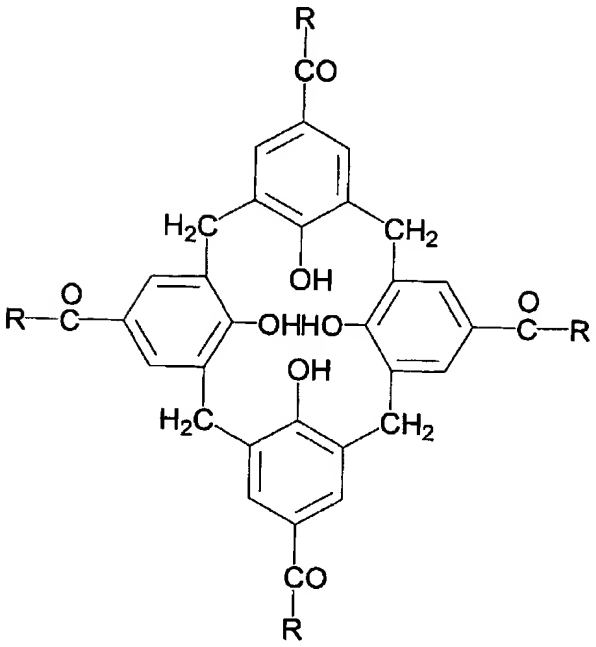

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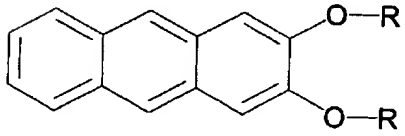
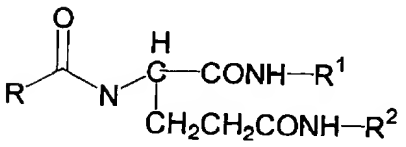


(9)

R^5 COOH (10)



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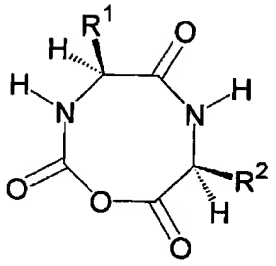

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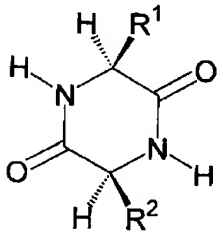

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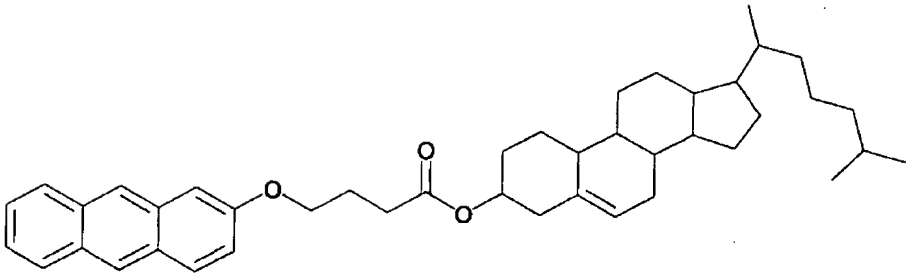

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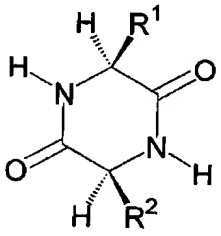

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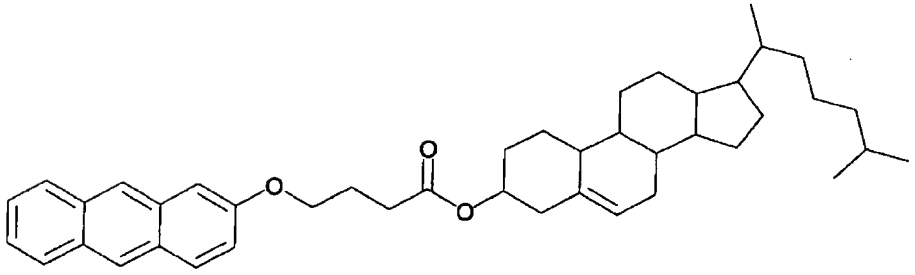

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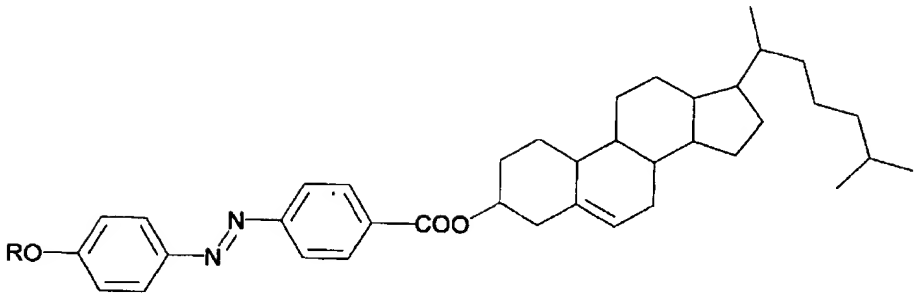

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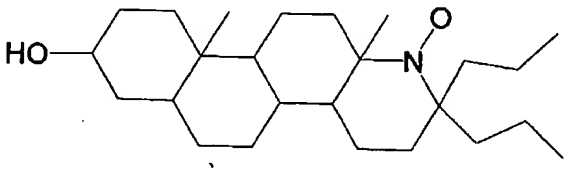

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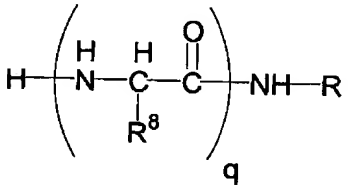

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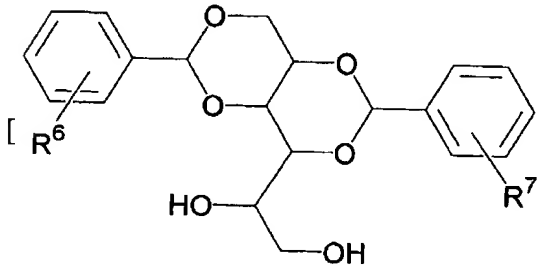

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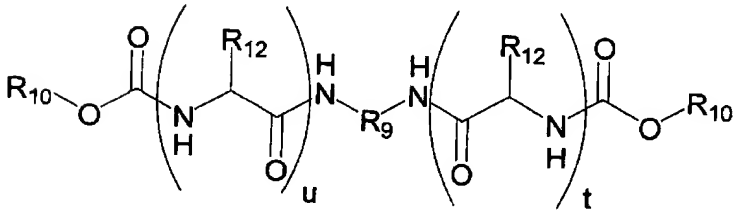

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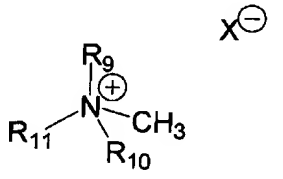

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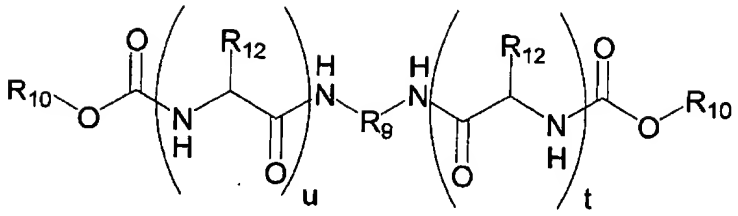

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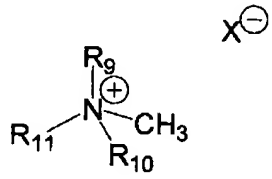

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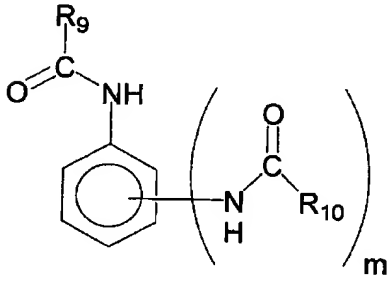

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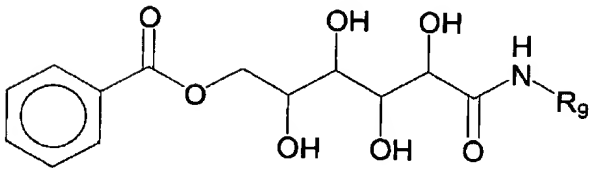

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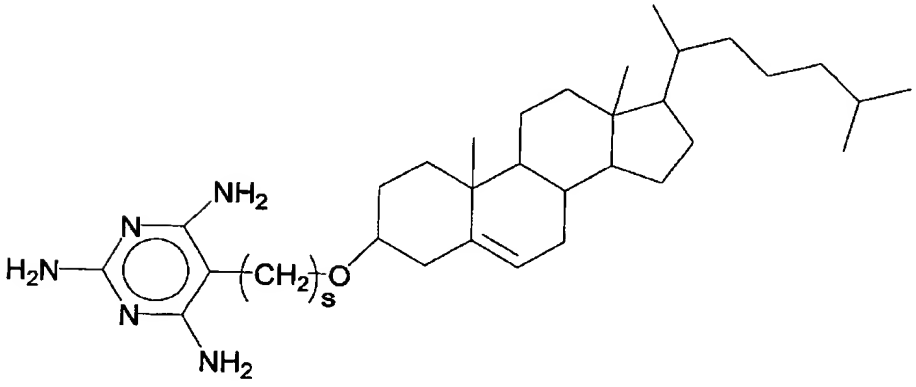

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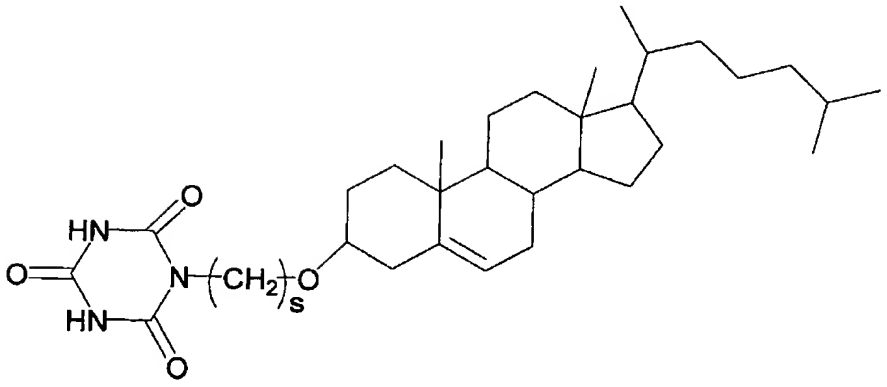

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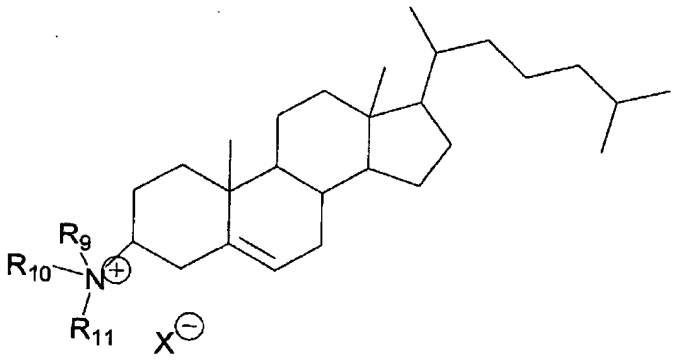

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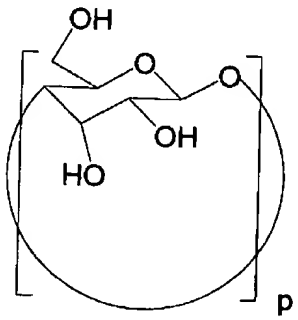
and



(26)

wherein, R, R_1 and R_2 are each hydrogen, or a straight-chain or branched aliphatic hydrocarbon group having a carbon number of 1 to 29; R_3 is an amino acid monomer or dimer with a protected amino group; R_4 is an aliphatic hydrocarbon having a carbon number of 1 to 29 or an aryl group; R_5 is a straight-chain aliphatic group

having a carbon number of 1 to 29 and being substituted with one hydroxyl group; R_6 and R_7, are each an aliphatic hydrocarbon group having a carbon number of 1 to 29 or an aryl group; R_8 is hydrogen, or an aliphatic hydrocarbon group having a carbon number of 1 to 5 or aryl group; n is 0, 1 or 2; q is an integer of 2 to 20; R_9, R_{10} and R_{11} are each hydrogen, or a straight-chain or branched aliphatic hydrocarbon group having a carbon number of 1 to 29; R_{12} is a side chain of an amino acid, or an alkyl or aryl group; X is a halogen; p is an integer of 6 to 8; m is an integer of 0 to 5 and s is an integer of 0 to 29, and a and t are an integer of 1 to 500.

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